Upper Airway Cough Syndrome

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PND *vs* UACS

In patients with chronic cough related to upper airway abnormalities, the committee considers the term UACS to be more accurate, and therefore it should be used instead of PNDS.

ACCP RECOMMENDATION, 2006

- Enhanced excitability of central pathways that produce cough

Medicine®

OPEN

Prevalence of chronic cough and possible causes in the general population based on the Korean National Health and Nutrition Examination Survey

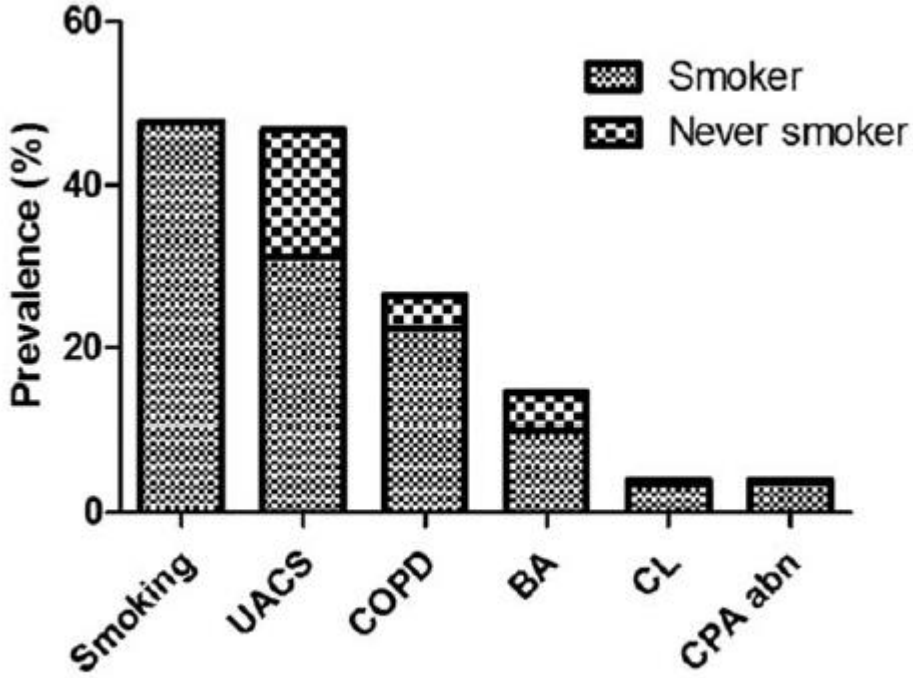

Figure 2. Prevalence of possible causes of chronic cough.

REVIEW

Rhinology, 46, 86-91, 2008

Postnasal drip syndrome. Two hundred years of controversy between UK and USA*

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SUMMARY

This review discusses the trans-Atlantic controversy concerning Post Nasal Drip Syndrome (PNDS). PNDS was described as a common condition in the UK in the nineteenth century and was so extraordinarily prevalent in the USA that it was called 'American catarrh'. American chest physicians adopted PNDS as the most common cause of chronic cough. A relationship between PNDS and chronic cough was not accepted by UK chest physicians, who preferred to use the term 'rhinosinusitis' instead of PNDS. In the USA the diagnosis of PNDS was linked to a response to therapy with a sedating antihistamine and decongestant, but UK physicians doubted if this was a specific therapy and did not accept the therapy as diagnostic for PNDS. In 2006 the American College of Chest Physicians replaced the term PNDS with upper airway cough syndrome and some UK otolaryngologists proposed that PNDS should be replaced with rhinosinusitis. PNDS is now being replaced with more general descriptions of upper airway disease and a causal link with chronic cough is now disputed. PNDS may be caused by a mucus hypersecretory phenotype that develops following chronic exposure of the respiratory tract to particulate matter, allergens, irritants and pathogens. Current research on treating excessive airway mucus in the lower airways may be applicable to PNDS.

Key words: postnasal drip, cough, rhinitis, sinusitis, rhinosinusitis, mucus

European Respiratory Society

Upper airway pathology

Key points

- Rhinosinusitis is commonly associated with chronic cough.
- There is an association between upper airway disease and cough but a poor association between the various symptoms and cough.
- There is disparity in the reported efficacy of antihistamines.

Recommendations

- In the presence of prominent upper airway symptoms a trial of topical corticosteroid is recommended.

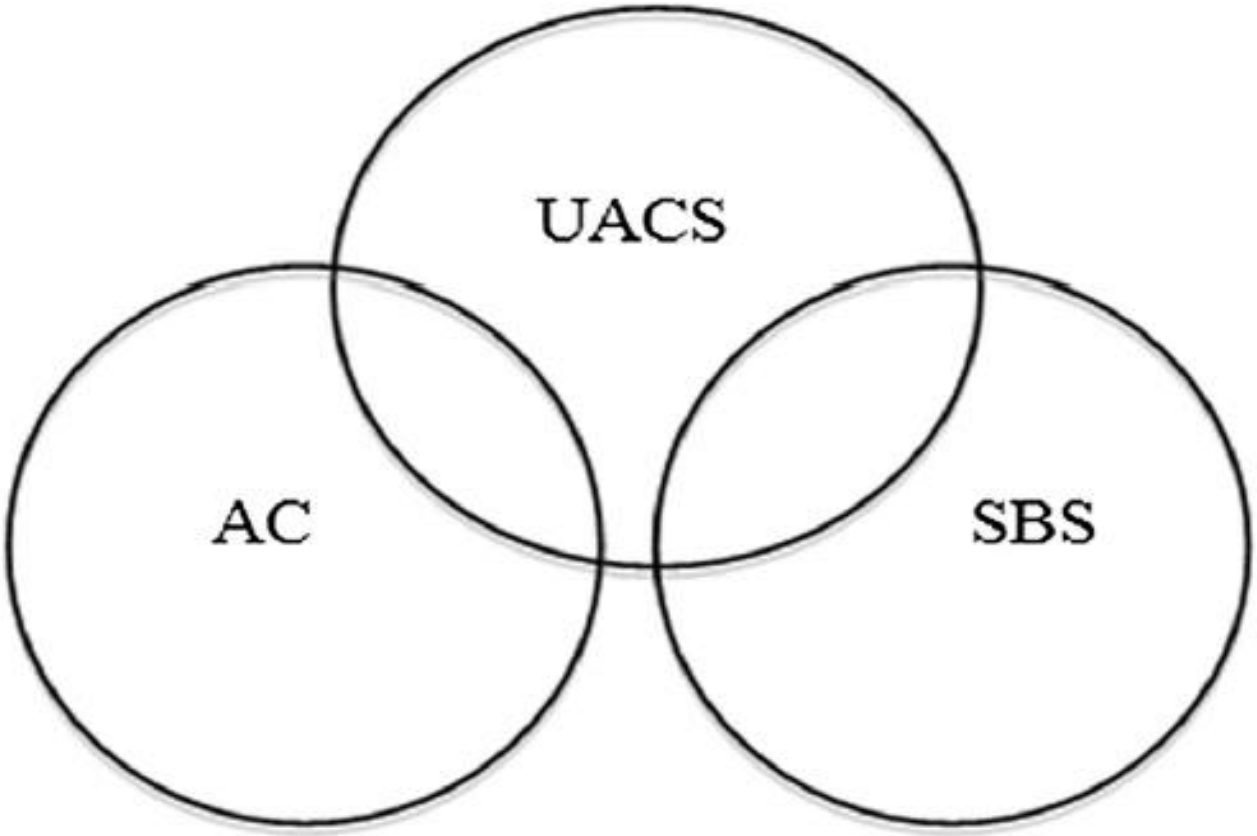
ERS does not accept a diagnosis of PNDS/UACS
as a symptom rather than a disease
While such diseases account for 6-21% of chronic cough cases in Europe, this prevalence is lower in the USA

Japanese Respiratory Society

- UACS/PNDS is not a common etiology of chronic cough

- Suggest sinobronchial syndrome (SBS) and atopic cough (AC)
- SBS
  : characterized by a chronic cough caused by chronic rhinosinusitis, and its symptoms are effectively treated with 14 or 15-member ring macrolides and expectorants.

Relationships among upper airway cough syndrome (UACS), atopic cough (AC), and sinobronchial syndrome (SBS)



Pathogenesis

- Postnasal drip theory
- Airway inflammation
- Sensory neural hypersensitivity theory
- Cough hypersensitivity syndrome

Absence of pulmonary aspiration of sinus contents in patients with asthma and sinusitis

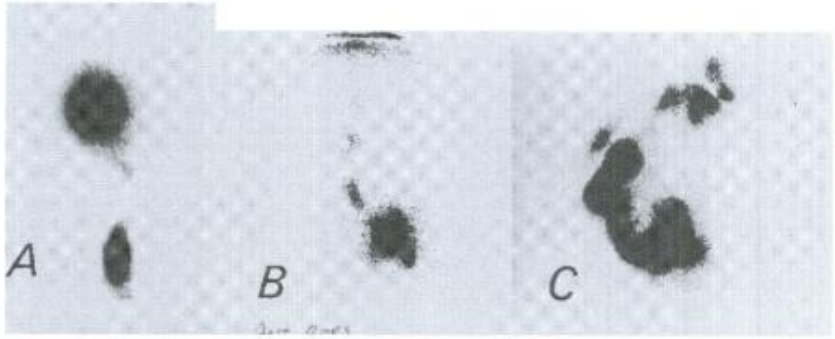


FIG. 2. A, Radionuclide present in maxillary sinus and nasopharynx. **B,** In esophagus and stomach. **C,** In rest of GI tract.

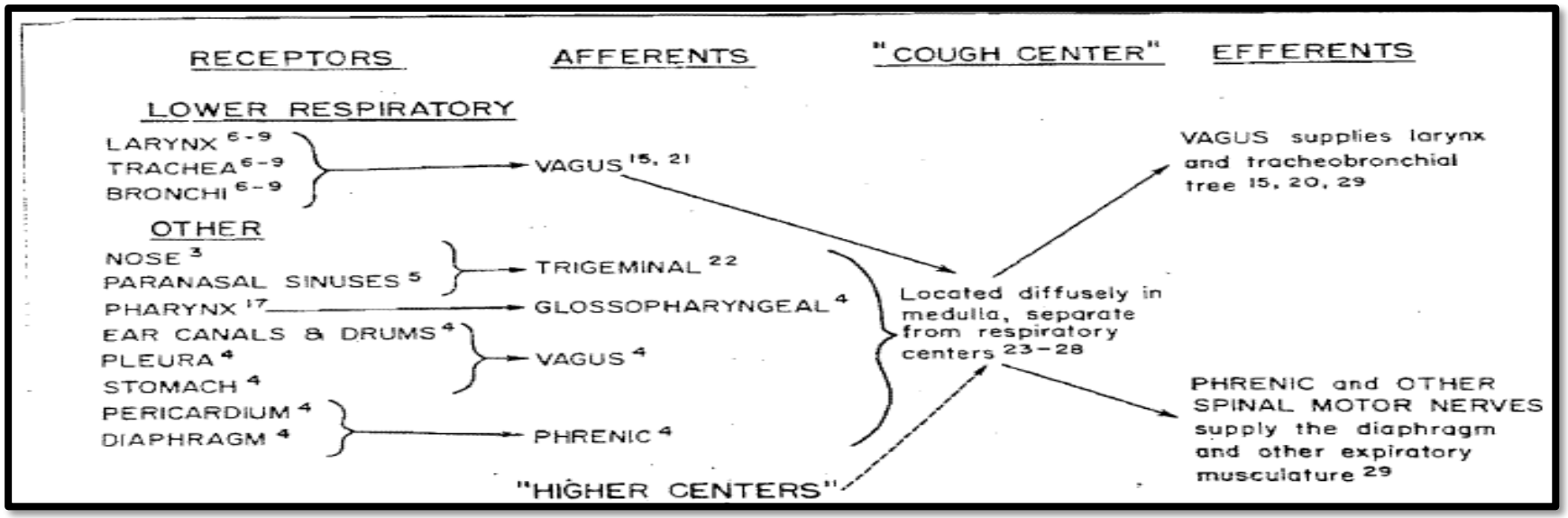
TABLE IV. Results of antral puncture and radionuclide studies in 13 patients with maxillary sinusitis

Patient No.	Contents of sinus aspirated	Microbiology cultures	Scan result	FEV_1/FVC (% pred) after puncture
1	Mucoid	Negative	Negative	52/84
2*	Mucoid	Negative	Negative	71/82
3	Mucoid	Negative	Indeterminate	30/58
4	Mucoid	Negative	Negative	75/92
5*	Mucoid	*Klebsiella streptococcus pneumoniae*	Negative	ND
6	Mucoid	Negative	Indeterminate	102/120
7†	Mucoid	Negative	Indeterminate	ND
8	Mucoid	Negative	Negative	50/64
9	Pus	*Staphylococcus aureus*	Negative	57/87
10	Serous	Negative	Indeterminate	85/96
11†	Pus	Negative	Negative	94/88
12*	None	Negative	Negative	81/106
13*†	Pus	*Klebsiella S. pneumoniae*	Negative	ND

ND, Not done.
*Study done at 4 PM.
†Patients with sinusitis only.

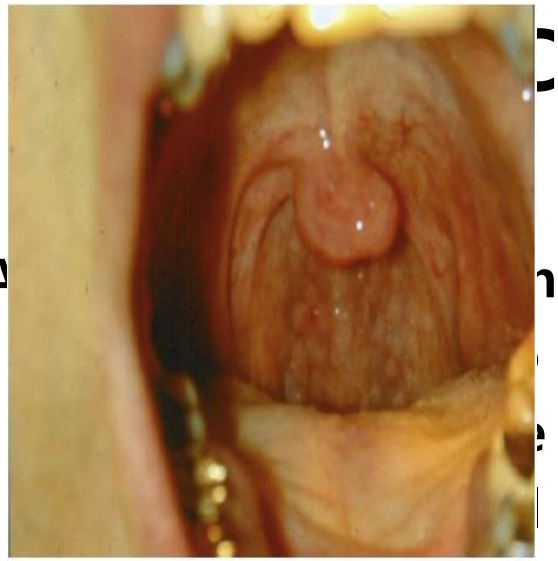
Pathogenesis

- the pathogenesis of cough from UACS is due to the mechanical stimulation of the afferent limb of the cough reflex in the upper airway



Arch Intern Med 137; 1186-1191, 1977

UACS-Clinical Presentation



Nasal discharge

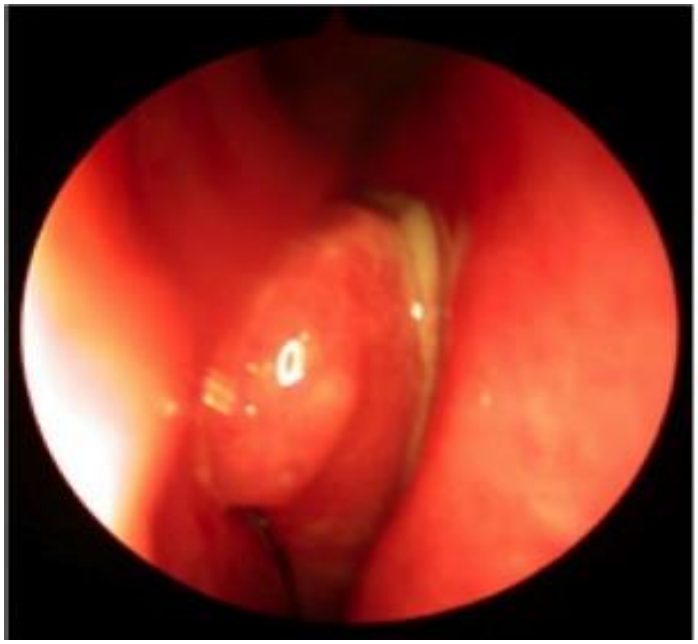
Hoarseness

These clinical findings : not specific.

Med Clin N Am: 2014(98); 391–403

UACS

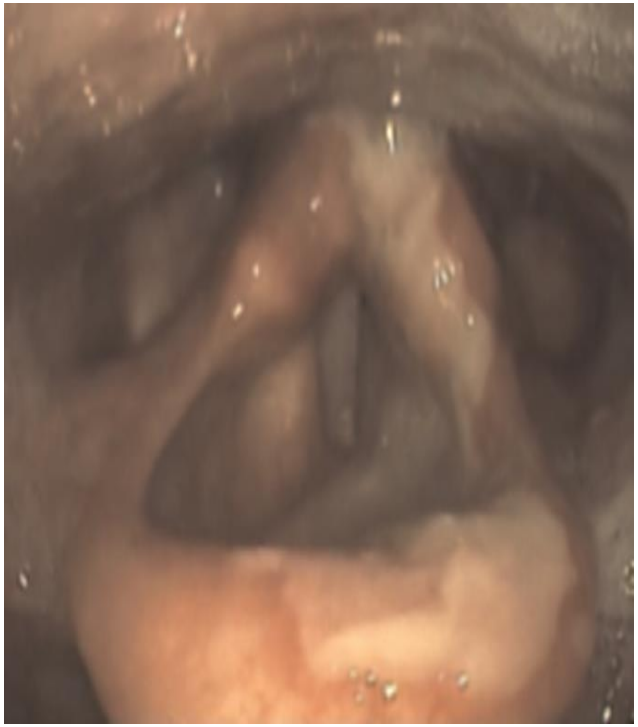
Coronal CT scan through the paranasal sinuses demonstrating extensive nasal polyposis.



Endoscopic view of the nose demonstrating inflammation, mucopus and polypoid change.

Cough 2013, 9:16

Flexible, transnasal laryngoscopic view of the patient, showing herpetic vesicles on the left supraglottis, most prominent on the left half of the epiglottis.



Cough after laryngeal herpes zoster
Flexible, transnasal laryngoscopic view numerous ulcers with purulent exudate on the left half of the epiglottis, the left supraglottic area

The Journal of Laryngology & Otology 2014(128): 209–211.

A diagnostic dilemma for chronic rhinosinusitis

Symptoms and Rhinosinusitis	Positive (+) CT Scan	Negative (− CT Scan
Nasal congestion/obstruction	7.4	7.5
Nasal drainage/discharge	5.6	6.0
Postnasal drainage	5.6	5.5
Halitosis	3.1	3.8
Visual complaints	1.2	1.6
Ear congestion	3.8	3.5
Cough	3.3	2.5
Hyposmia/anosmia	3.3	7.2
Facial pain/pressure/headache	4.6	3.6
Quality of life score	5.9	5.4
Staging	2.24	0

American Journal of Rhinology
2002(16), 199-202

UACS

- The appropriate role and timing of sinus imaging in patients with chronic cough has yet to be established.
- Naso endoscopy : may confirm the presence of upper airway inflammation, but there is no evidence to suggest its routine use in cough
- Plain sinus radiograph : only 29% of patient diagnosed with cough due to sinusitis. ***Rhinology 1992 Sep; 30(3):205-15.***
- CT imaging of the sinuses : poor predictive value

Curr Opin Otolaryngol Head Neck Surg 2004(12)27–29.

UACS

- **The problem, however, encountered w hen**

  trying to diagnose UACS is that

No objective test

A trial of therapy : first line of investigation

UACS

- **Diagnosis**

history

physical exam

laboratory

treatment

UACS

Potential causes of UACS

- Allergic rhinitis
- Perennial non-allergic rhinitis
  - Vasomotor rhinitis
  - Nonallergic rhinitis with eosinophilia (NARES)
- Post-infectious rhinitis
  - Following upper respiratory tract infection
- Bacterial sinusitis
- Allergic fungal sinusitis
- Rhinitis due to anatomic abnormalities
- Rhinitis due to physical or chemical irritants
- Occupational rhinitis
- Rhinitis medicamentosa
- Rhinitis of pregnancy

Chest 2006(129): 63S–71S.

Allergic Rhinitis

- IgE-mediated hypersecretory state that is stimulated by specific antigens.
- Allergic rhinitis is extremely common(up to 20% of individuals)
- Seasonal variation
- Common to allergic rhinitis than to other forms of rhinitis are sneezing and extranasal involvement, such as itching of the eyes and ears
- Skin test?

Perennial Nonallergic Rhinitis

- Vasomotor rhinitis

- Nonallergic rhinitis with eosinophilia (NARES).

Vasomotor rhinitis

- Excessive, thin, watery secretions, often in response to stimuli such as odors, changes in temperature or humidity, eating (called gustatory rhinitis), or alcohol ingestion.
- Sudden unexpected onset of profound rhinorrhea, or nasal congestion with or without the sensation of postnasal drip.
- Autonomic imbalance
- Increased cholinergic tone or sensitivity :
  -> effectiveness of ipratropium bromide in controlling vasomotor symptoms.
- Nasal examination findings are nonspecific
- Allergy testing is negative
- No relationship to infection, structural abnormalities, or systemic disease
- idiopathic and a diagnosis of exclusion.

NARES

- Nasal symptoms similar to those of vasomotor rhinitis+ pruritus of nasal and ocular mucosae as well as excessive lacrimation.
- Clinical syndrome coupled with the presence of eosinophils in nasal secretions in the absence of evidence for both allergy and asthma.
- The diagnosis of perennial nonallergic rhinitis is to a significant extent a diagnosis of exclusion.
- Allergic rhinitis can be present year.
- Allergy evaluation should be considered even in cases of presumed perennial nonallergic rhinitis if the response
- to therapy is inadequate.
- Environmental irritant, a nasal medication, or illicit drug abuse should be considered.

Postinfectious UACS

- A history of a upper respiratory tract infection is the key.
- This condition typically responds to a first generation antihistamine along with a decongestant.

-> chronic cough that develops following a viral respiratory tract infection.

Mycoplasma, Chlamydia pneumoniae, pertussis

Bacterial Sinusitis

- UACS-induced cough secondary to chronic sinusitis may or may not be associated with chronic excessive sputum production (ie, 30 mL/d).

- In one study that specifically identified patients with excess it is important to recognize that chronic sinusitis may cause a productive cough, but also may be “clinically silent”

Bacterial Sinusitis

- The presence of sinus mucosal thickening, and in particular of opacification, and/or air-fluid levels in the presence of chronic cough : predictive evidence for bacterial sinus infection and is the basis for antibiotic treatment.

- The most common etiologic agents: *Staphylococcus aureus*, coagulase-negative staphylococci, anaerobic bacteria, *Haemophilus influenzae, Moraxella catarrhalis*, and a variety of Gram-negative bacillary organisms

Allergic Fungal Sinusitis

- Rhinosinusal disease that is analogous to allergic bronchopulmonary mycosis in the lung.
- atopic patients with chronic sinusitis with purulent expectoration or nasal drainage that is refractory to antibiotic treatment.
- Any one of a number of fungi can create an allergic and inflammatory response that can be symptomatic and destructive.
- The presentation may be gradual in onset or relatively abrupt.

Allergic Fungal Sinusitis

- The key feature of the disease is a thick allergic fungal mucin that.
- Nasal crusting and nasal polyposis are also commonly encountered.
- The inflammatory response to fungal antigen (not fungal invasion) can cause bony destruction and ocular disorders.
- The total IgE level is commonly elevated, and the results of skin testing are generally positive for one of the dematiaceous fungi.

Other causes

- Rhinitis Due to Anatomic Abnormalities
- Rhinitis Due to Physical or Chemical Irritants
- Occupational Rhinitis
- Rhinitis Medicamentosa
- Rhinitis of Pregnancy

Treatment
UACS Due to Allergic Rhinitis

- Although the avoidance of the offending antigens is always desirable, this is usually not completely possible.
- Nasal corticosteroids, antihistamines, and/or cromolyn are usually the initial drug choices for the treatment of UACS due to allergic rhinitis.
- Nonsedating antihistamines: more effective.

Treatment
Vasomotor Rhinitis

- older-generation antihistamine plus a decongestant
- ipratropium bromide nasal spray

Treatment
Sinusitis

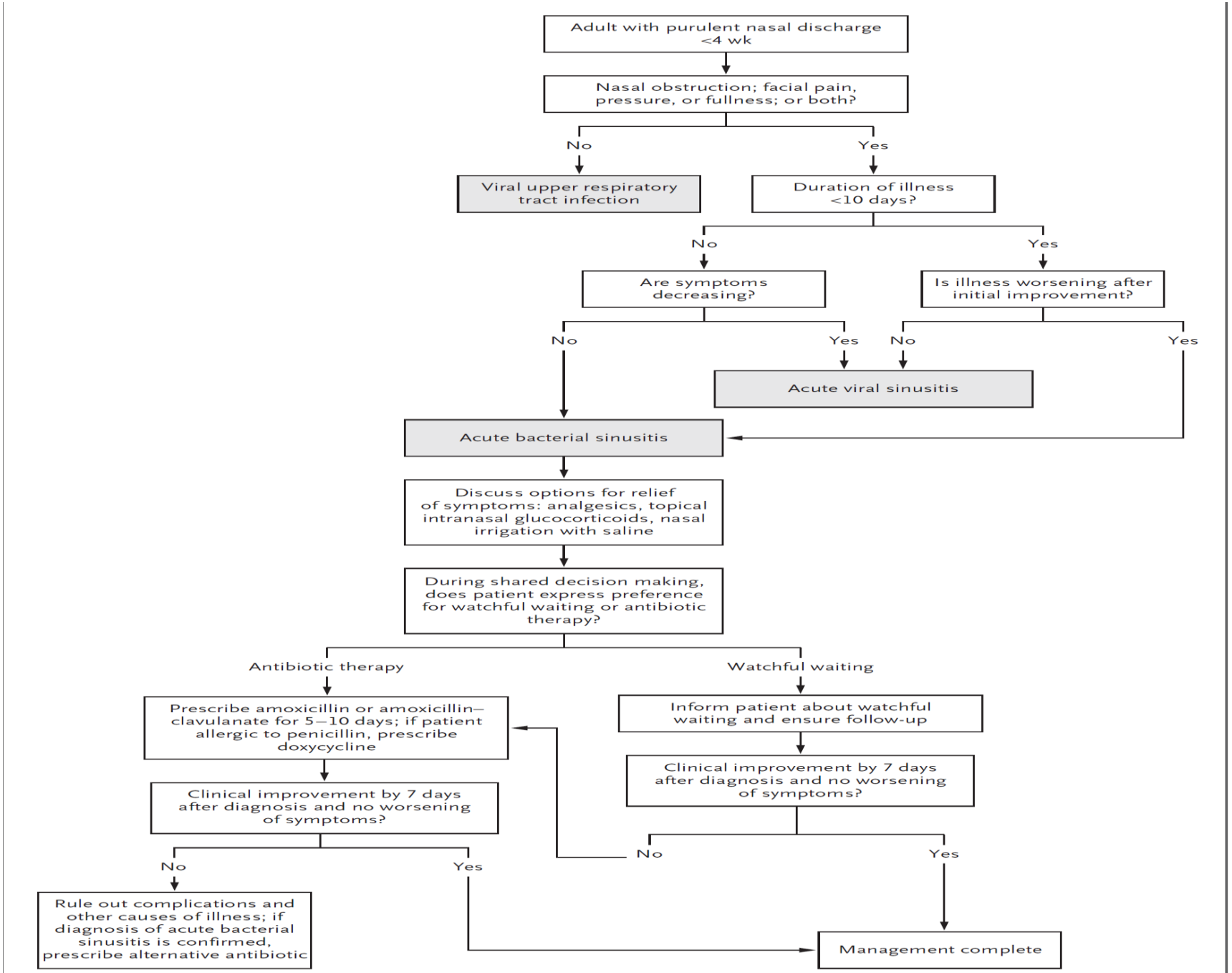
- Acute sinusitis (generally defined as being of no 3 weeks duration) is probably most often caused by acute viral rhinosinusitis

- When acute sinusitis does involve a bacterial infection, *Streptococcus pneumoniae, H. influenzae. anaerobes, streptococcal species, M catarrhalis and S.aureus.*

KEY CLINICAL POINTS

ACUTE SINUSITIS IN ADULTS

- The diagnosis of acute bacterial sinusitis is based on the presence of purulent nasal discharge accompanied by nasal obstruction; facial pain, pressure, or fullness; or both that persists for at least 10 days without improvement or worsens within 10 days after initial improvement.
- Analgesics, nasal irrigation with saline, and topical intranasal glucocorticoids or decongestants may be used to relieve symptoms.
- Randomized trials that primarily involve otherwise healthy nonpregnant adults seen in primary care settings have compared watchful waiting (without antibiotics) with initial antibiotic therapy. These trials have shown small clinical benefits of antibiotics over placebo (number needed to treat to reduce symptoms, 7 to 18). Both of these approaches are valid initial management options.
- Watchful waiting is offered only if the clinician is sure that the patient will return for follow-up if the symptoms do not decrease. Antibiotic therapy is initiated if the patient's condition has not improved by 7 days after diagnosis or if it worsens at any time. If antibiotics are used, amoxicillin or amoxicillin–clavulanate are recommended as first-line therapy.


Adult with purulent nasal discharge <4 wk
Nasal obstruction; facial pain, pressure, or fullness; or both?
No
Yes
Viral upper respiratory tract infection
Duration of illness <10 days?
No
Yes
Are symptoms decreasing?
Is illness worsening after initial improvement?
No
Yes
No
Yes
Acute viral sinusitis
Acute bacterial sinusitis
Discuss options for relief of symptoms: analgesics, topical intranasal glucocorticoids, nasal irrigation with saline
During shared decision making, does patient express preference for watchful waiting or antibiotic therapy?
Antibiotic therapy
Watchful waiting
Prescribe amoxicillin or amoxicillin–clavulanate for 5–10 days; if patient allergic to penicillin, prescribe doxycycline
Inform patient about watchful waiting and ensure follow-up
Clinical improvement by 7 days after diagnosis and no worsening of symptoms?
Clinical improvement by 7 days after diagnosis and no worsening of symptoms?
No
Yes
No
Yes
Rule out complications and other causes of illness; if diagnosis of acute bacterial sinusitis is confirmed, prescribe alternative antibiotic
Management complete

Treatment
Sinusitis

- The treatment of chronic sinusitis is even less clear-cut.
- The role of bacterial infection and the importance of antibiotic therapy are controversial.
- Minimum of 3 weeks of treatment with an antibiotic effective against *H. influenzae*, mouth anaerobes, and *S. pneumoniae*;
- Minimum of 3 weeks of oral treatment with an older-generation A/D twice per day; and 5 days of treatment with a nasal decongestant twice per day.
- When cough disappears with this therapy, intranasal corticosteroids should be continued for 3 months.
- Refractory to medical therapy and in whom anatomic obstruction : endoscopic sinus surgery

Treatment
Allergic fungal sinusitis

- Surgical removal of the allergic fungal mucin
- Subsequent aeration/drainage of any involved sinus.
- Steroid therapy is only suppressive.
- The role of oral antifungal agents may be of potential value and a worthwhile option to consider prior to proceeding with surgery.

Table 1 Guidelines for treatment of upper airway cough syndrome in different countries and areas.

	USA	UK	Europe	Australia	Japan	China
Allergic rhinitis	New-generation A + D	Nasal steroids	New-generation A + D	Nasal steroids +(A)	A	Nasal steroids + A; D (if necessity)
Nonallergic rhinitis	First-generation A + D					First-generation A + D
Chronic rhinosinusitis	First-generation A + D; Nasal steroids Antibiotic			Nasal steroids; Antibiotic (purulent)	Low dose of 14/15-member ring macrolide	Nasal steroids; First-generation A + D; Low dose of macrolide; Antibiotic

A = antihistamine; D = decongestant.

Kaohsiung Journal of Medical Sciences (2015) 31, 223- 228

Recommendation

– In UACS, intranasal steroid can be considered in order to improve cough (evidence, very low; recommendation, weak).
– In UACS, oral anti-histamine is recommended to improve cough (evidence, very low; recommendation, strong).
– In UACS, using nasal decongestant only is not recommended to improve cough (evidence, expert opinion; recommendation, strong).
– In UACS, intranasal anti-histamine is not considered to improve cough (evidence, very low; recommendation, weak).
– In UACS, antibiotics is not recommended to improve cough (evidence, expert opinion; recommendation, strong).

The Korean Cough Guideline

Summary

- UACS is syndrome of which various upper airway disease cause cough.
– UACS is diagnosed based on symptom, physical examination, radiologic finding, and response to empirical treatment.
– If UACS is diagnosed, adequate treatment should be initiated.
– If UACS is suspicious, first generation anti-histamine and nasal decongestant can be used empirically.

The Korean Cough Guideline